Supporting Information for

"Imaging the eastern Trans-Mexican Volcanic Belt with ambient seismic noise: evidence for a slab tear"

Jorge C. Castellanos[1], Robert W. Clayton[1], and Xyoli Pérez-Campos[2]

[1]Seismological Laboratory, Department of Earth and Planetary Sciences, Caltech, Pasadena, California, USA.

[2]Instituto de Geofísica, Universidad Nacional Autónoma de México, Ciudad de México, Mexico.

Corresponding author: Jorge C. Castellanos, `jacastil@caltech.edu`

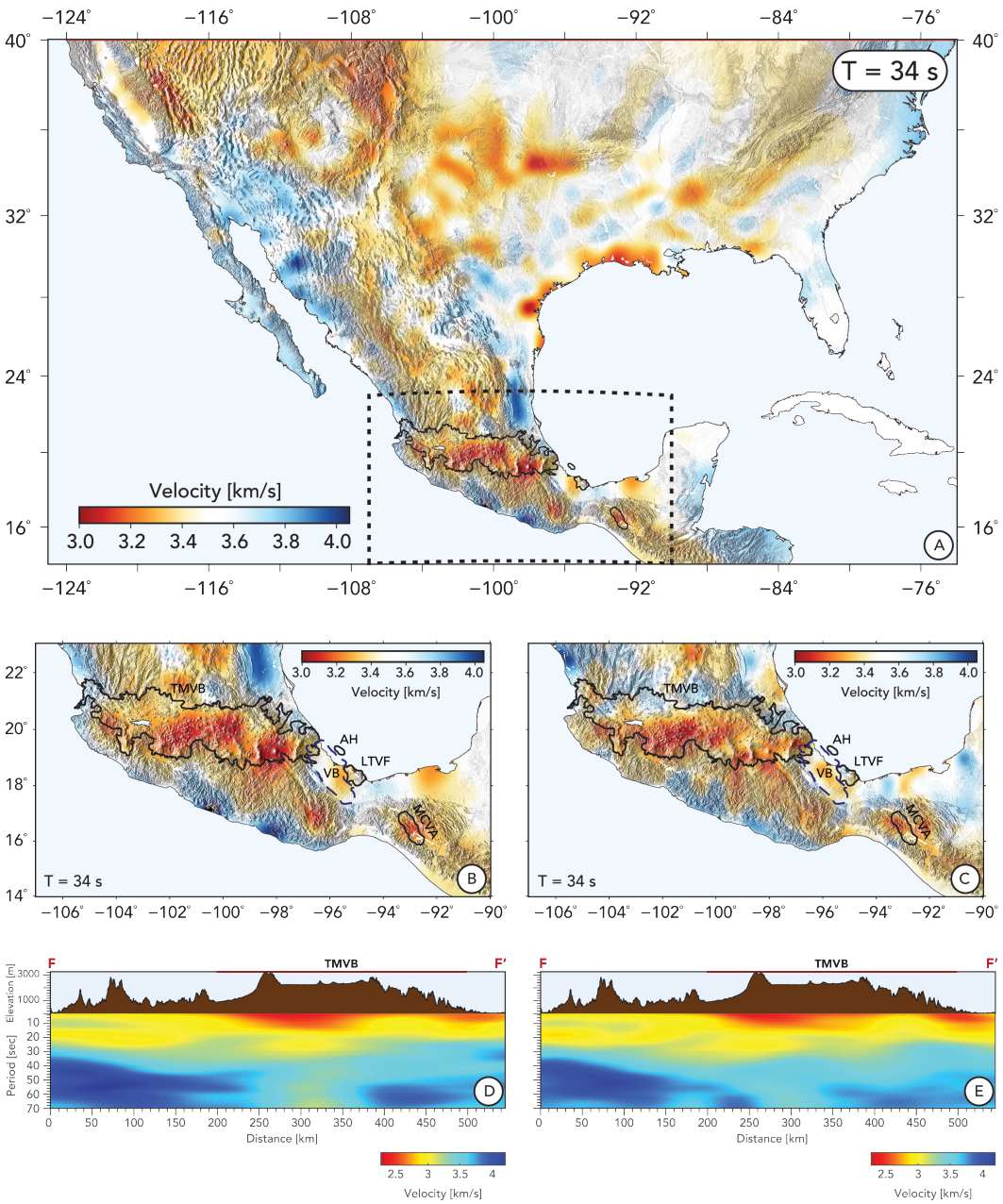


Figure S1. A) Rayleigh wave group velocity map at 34 s retrieved from inverting an area that includes every station used in this study. B) Zoom of Figure S1A into this study target area. C) Rayleigh wave group velocity map at 34 s retrieved from inverting this study target area only. D) Cross-section along the MASE line of the model shown in Figure S1B. E) Cross-section along the MASE line of the model shown in Figure S1C. To generate Figure S1A,B,D, we used all of the southern United States C1 and C3 ZZ cross-correlations of Spica et al. (2016) and calculate their dispersion, since we did not compute any interstation cross-correlations for stations above the US-Mexico border in this study.

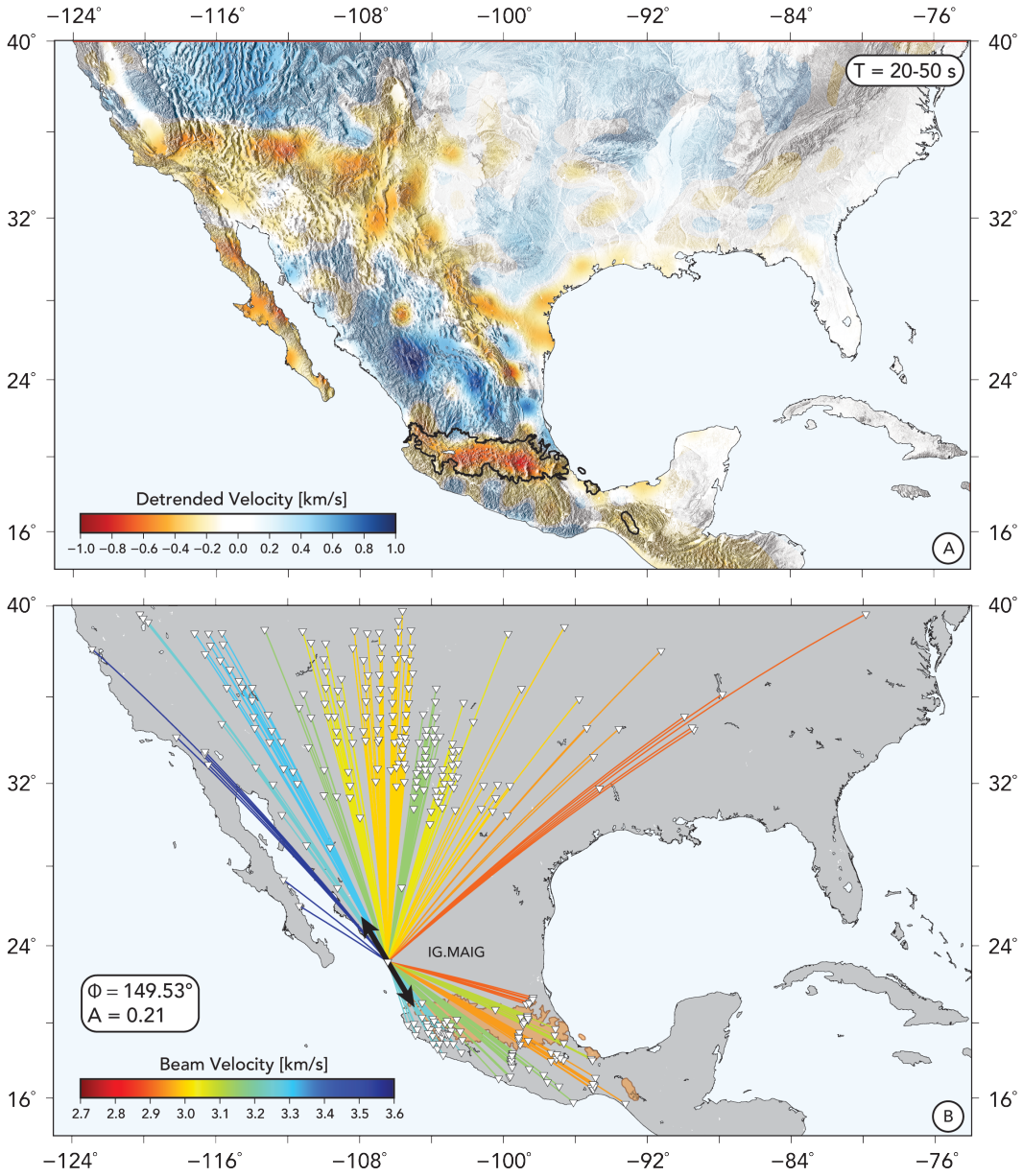


Figure S2. A) Stacked map of all the de-trended Rayleigh wave phase velocity maps for the 20-50 s period band. B) Results of the beamforming process for station IG.MAIG for the 20-50 period band. The thick black arrow represents the fast azimuth direction retrieved from our beamforming analysis. Both of this images show no strong correlation, thus suggesting that there is no significant tradeoff between lateral heterogeneities and azimuthal anisotropy. As in Figure S1AB, to generate Figure S2A, we used all of the southern United States C1 and C3 ZZ cross-correlations of Spica et al. (2016), since we did not compute any interstation cross-correlations for stations above the US-Mexico border in this study.

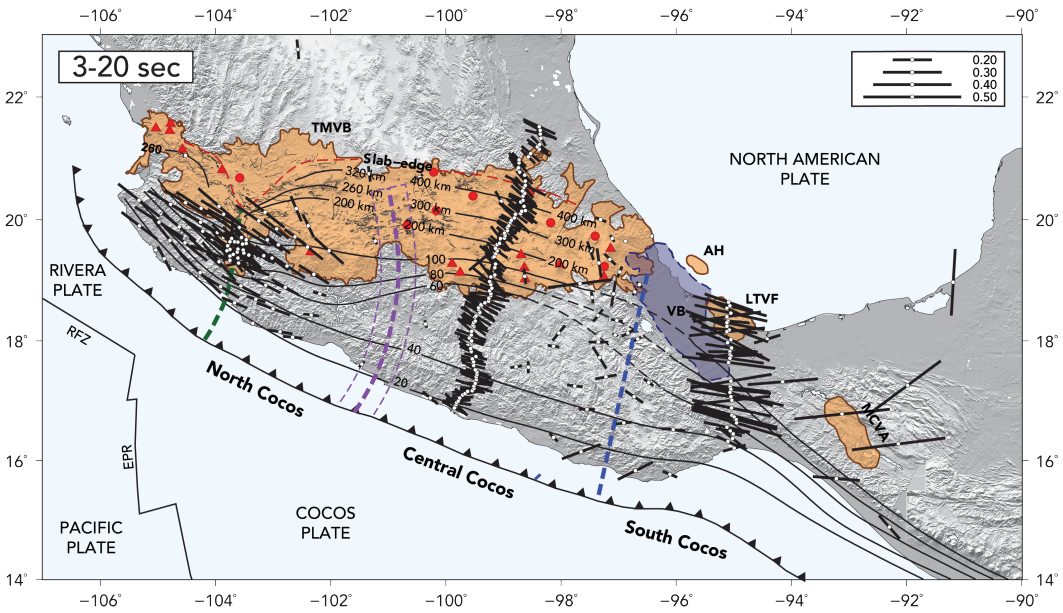


Figure S3. Map of the azimuthal anisotropy results for the upper crust. The orientation of the vectors give the seismically fast direction, ϕ, and the length of the lines is proportional to the amplitude of the anisotropy, A. The black thin lines indicate mapped faults [from Ferrari et al., 2012].

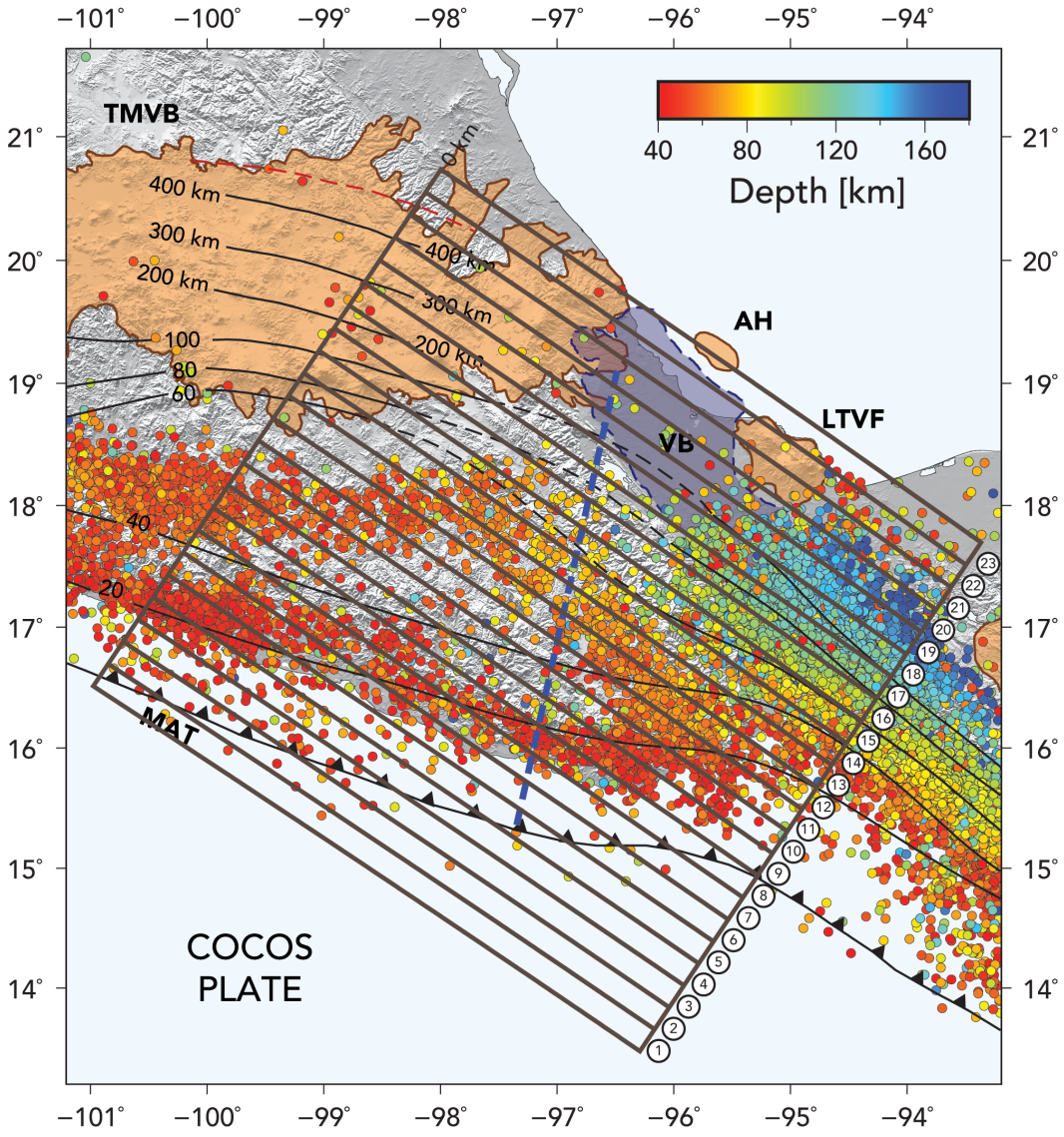


Figure S4. Map of epicenters for 40-180 km depth earthquakes from the *Servicio Sismológico Nacional* (SSN) since 1998. Each of the 23 brown rectangles represents a bin of approximately 25 km that is used to group the seismicity and analyze its variations along the MAT. The black contour lines depict the depth of the subducted slab. The volcanic provinces: the Trans-Mexican Volcanic Belt (TMVB), the Anegada High (AH), the Tuxtlas Volcanic Field (TVF) and the Modern Chiapanecan Volcanic Arc (MCVA) are delimited by the orange areas. The light blue region delimits the Veracruz basin (VB).

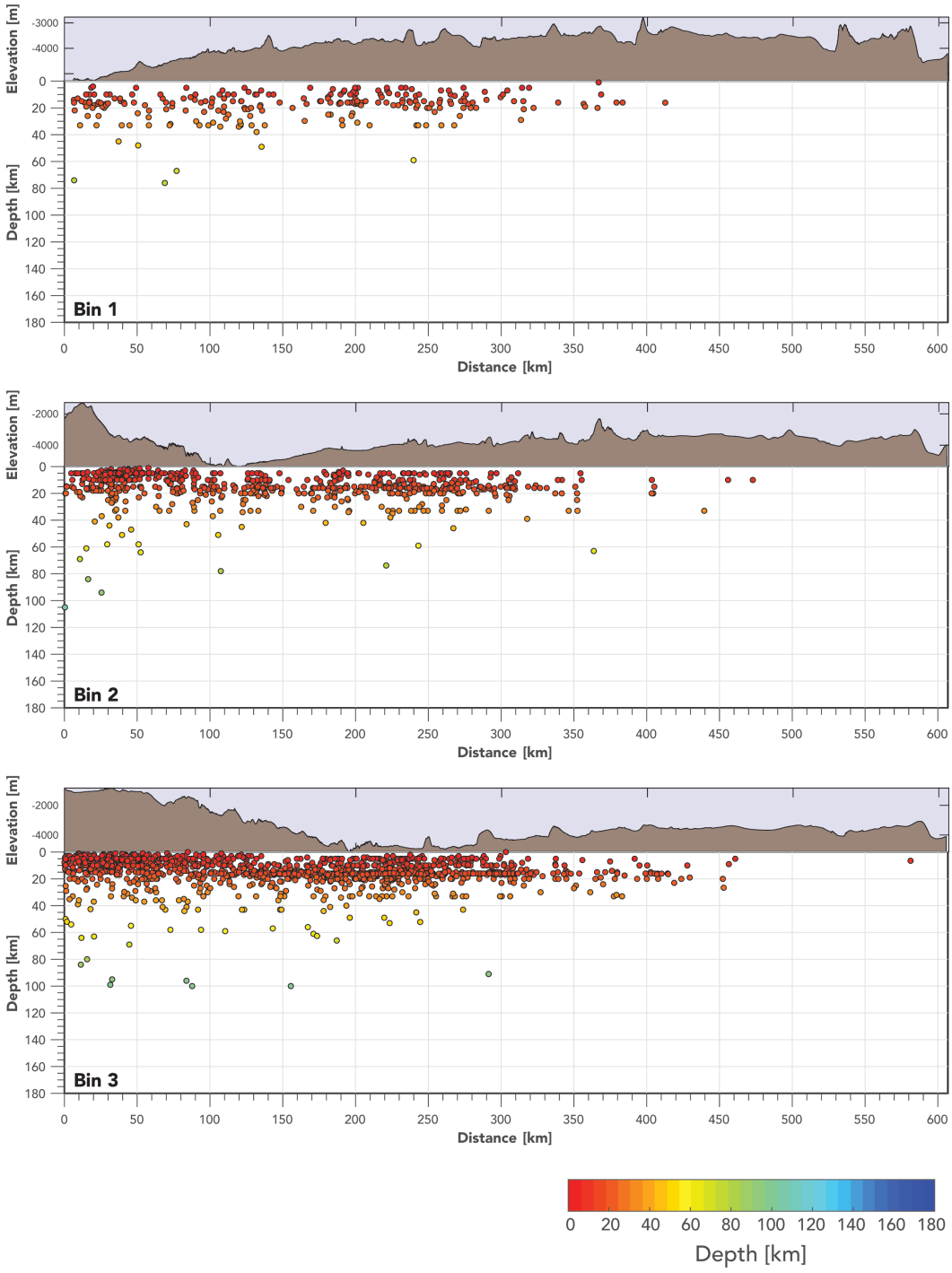
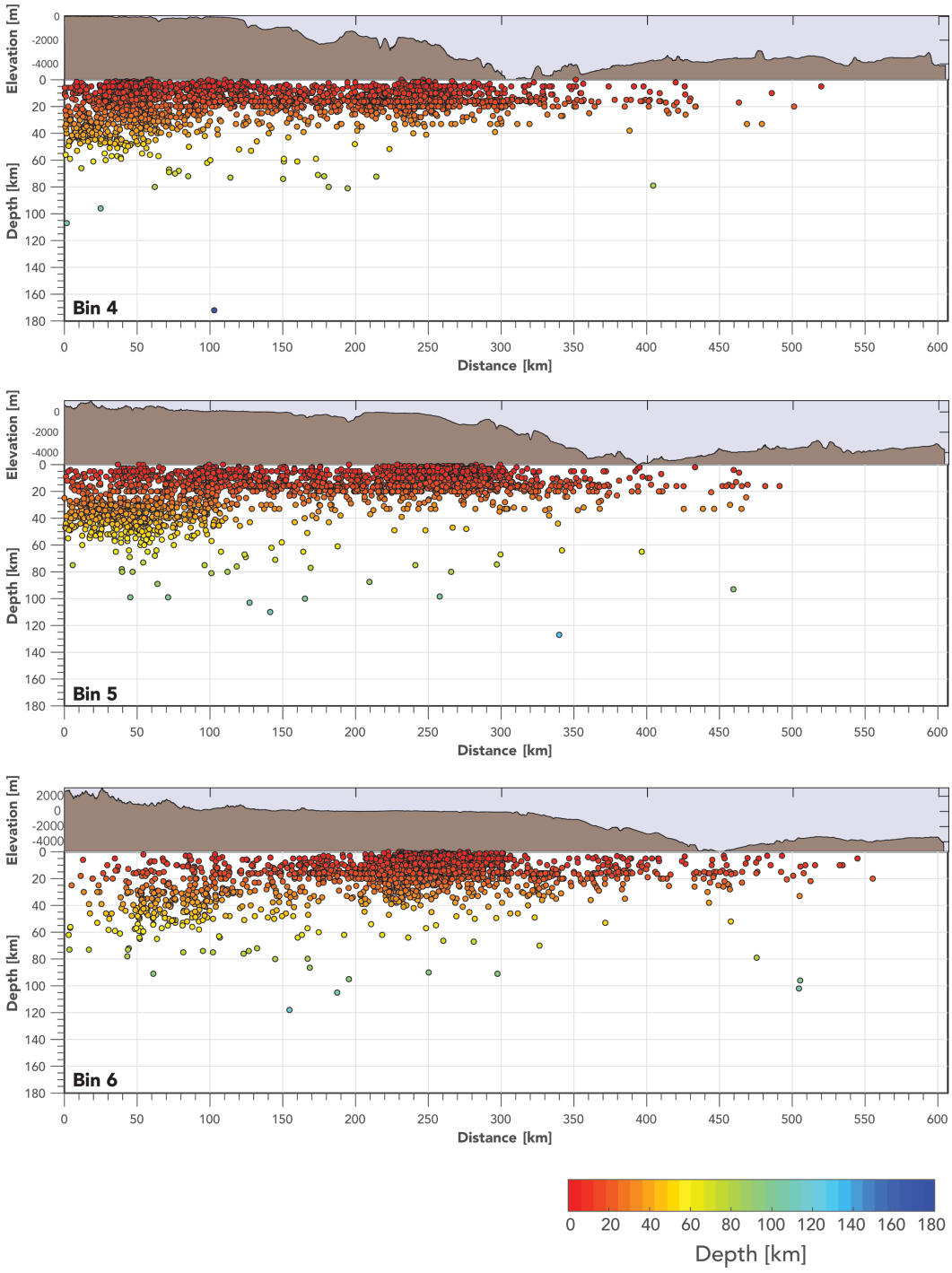


Figure S5. Cross-sections of the seismicity grouped in each bin in Figure S4. Note that earthquakes shallower than 40 km are also included in these profiles. Topography is shown above each respective profile.



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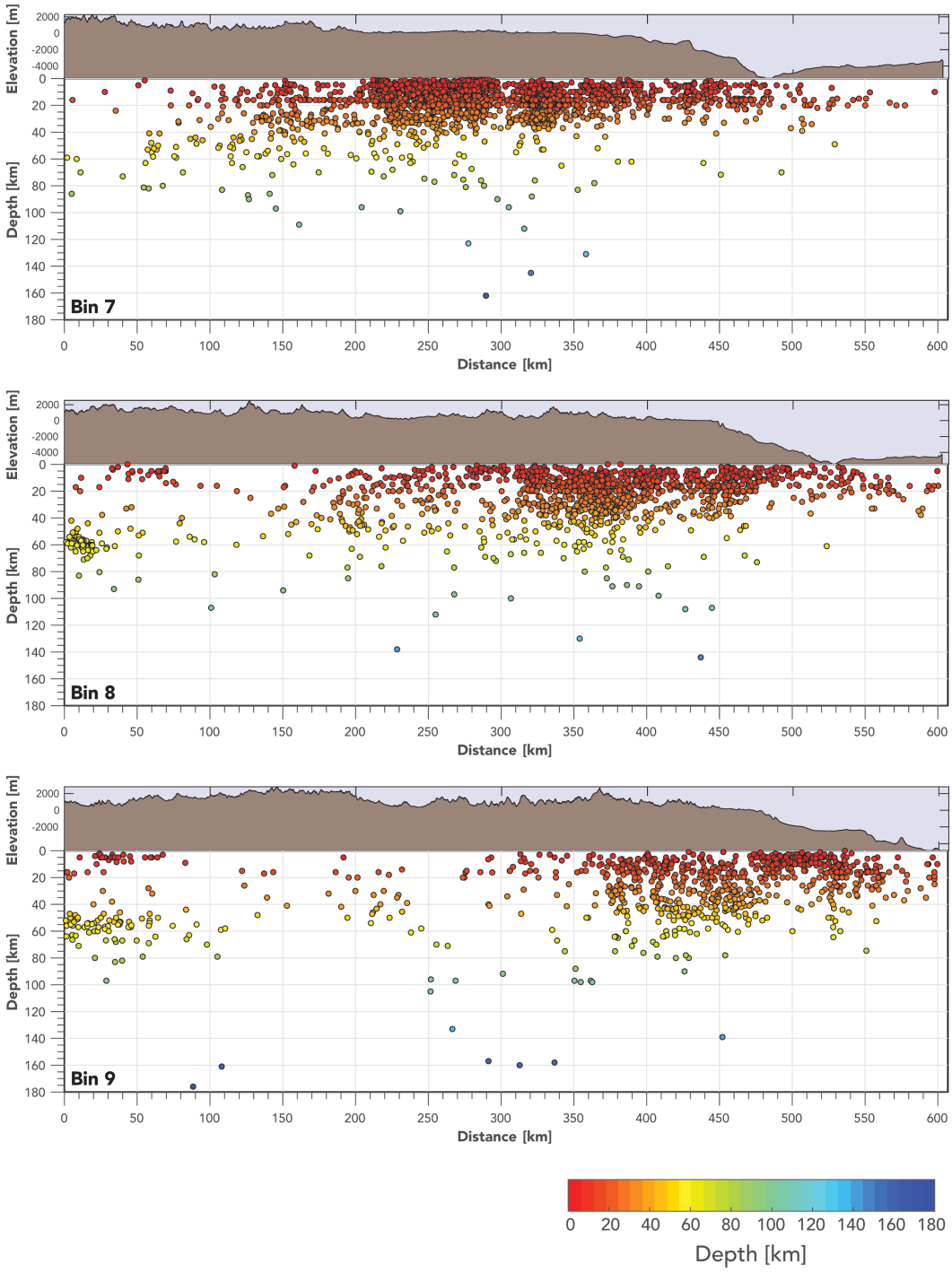

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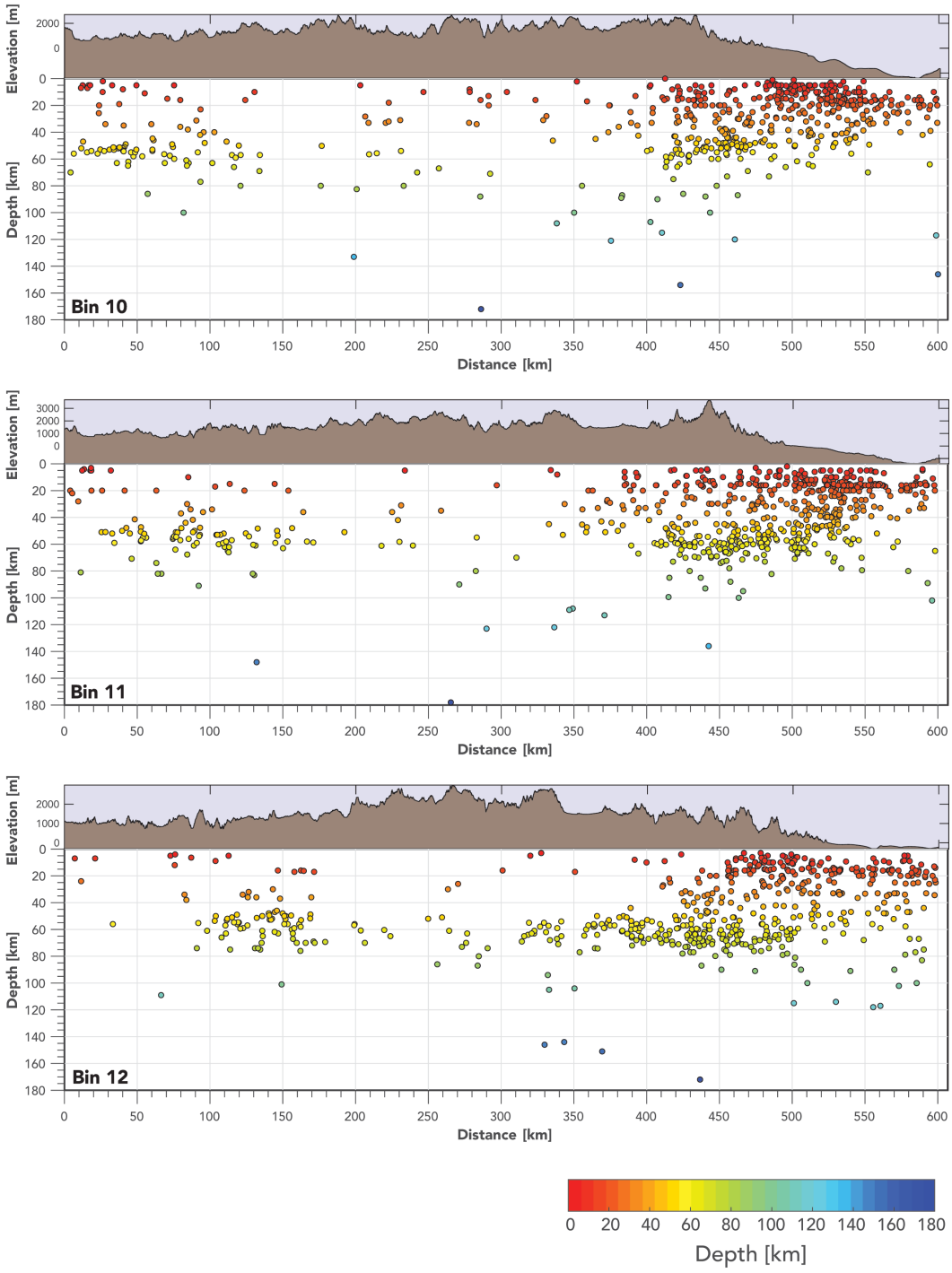

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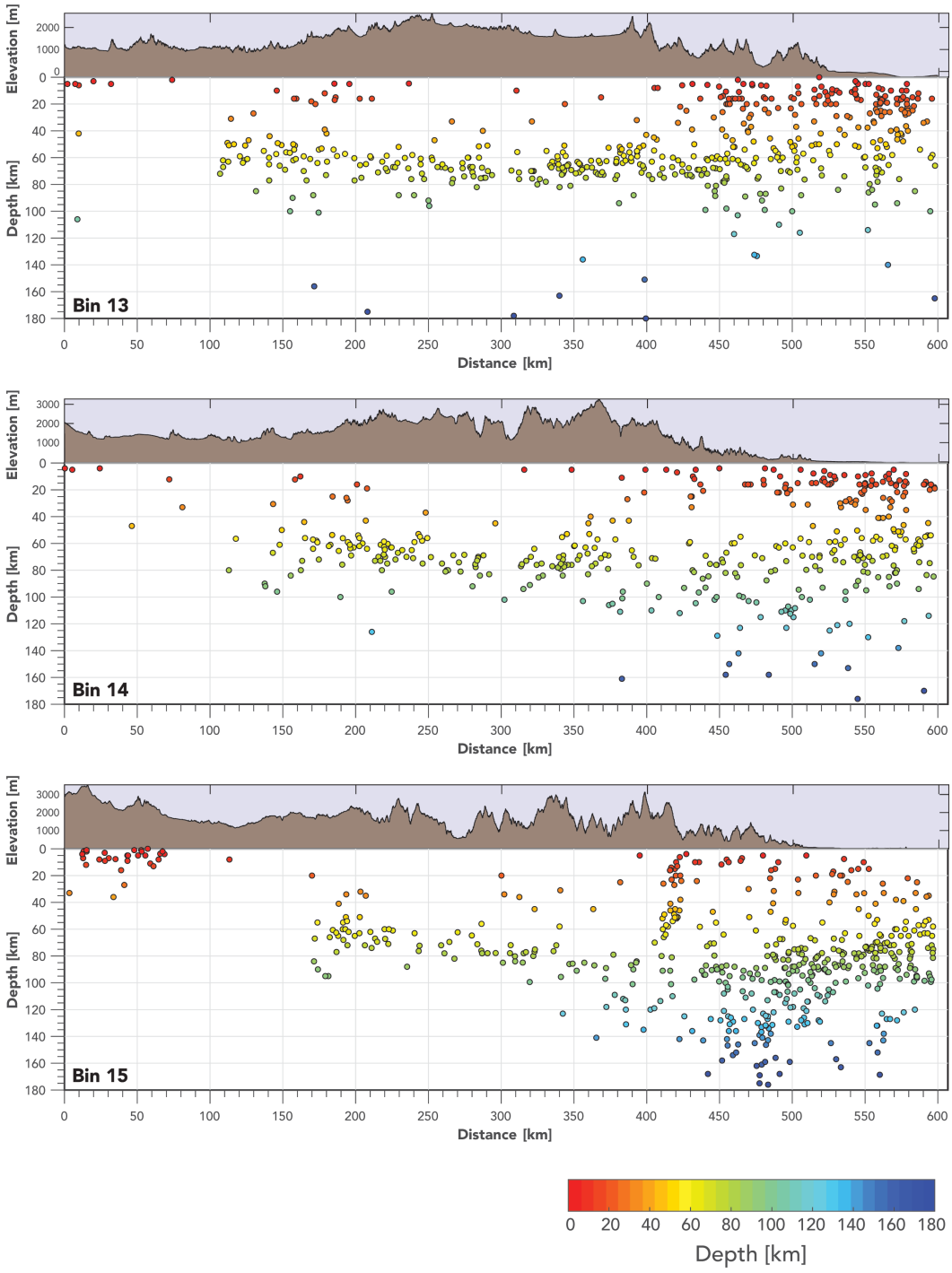

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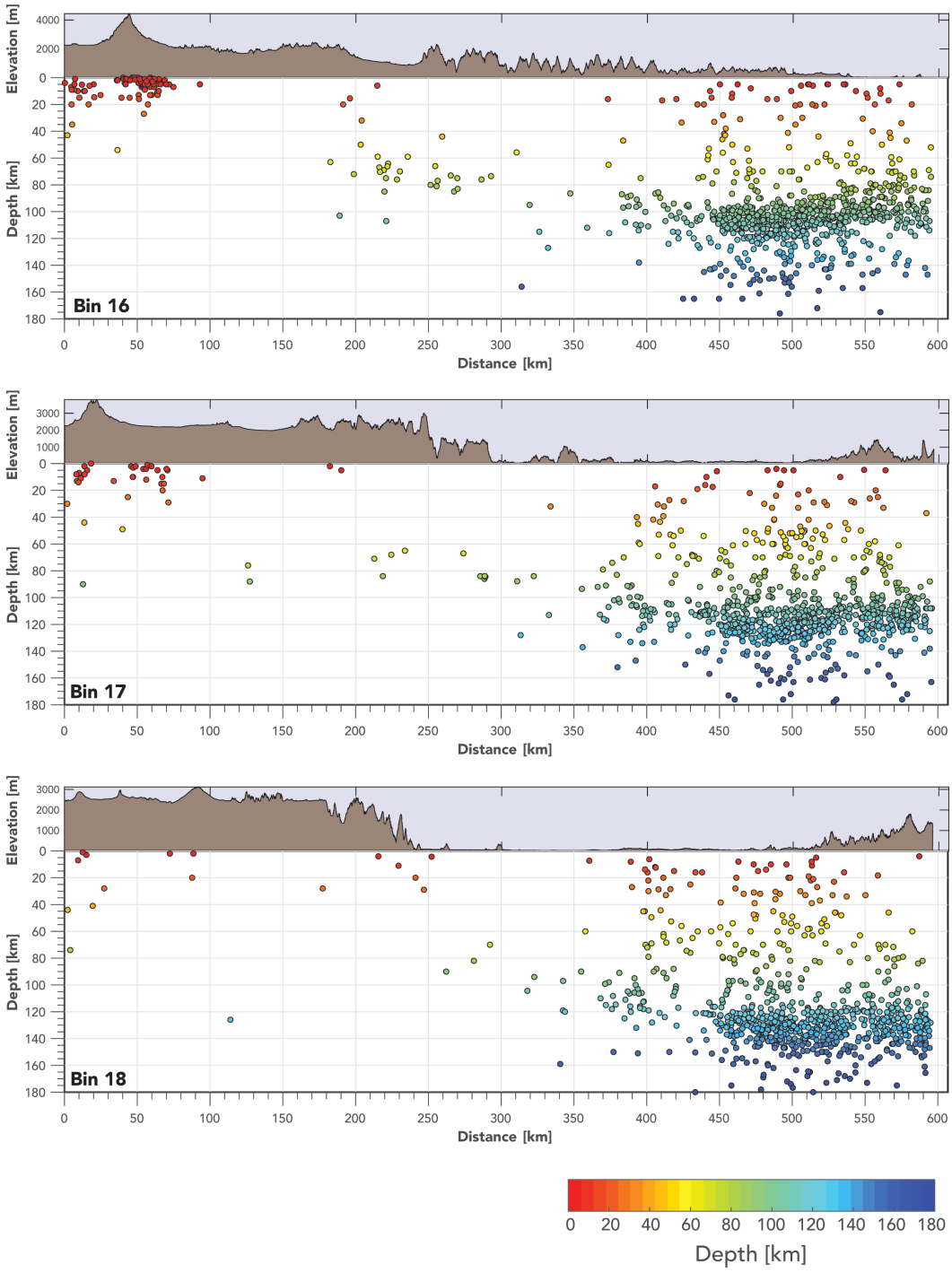

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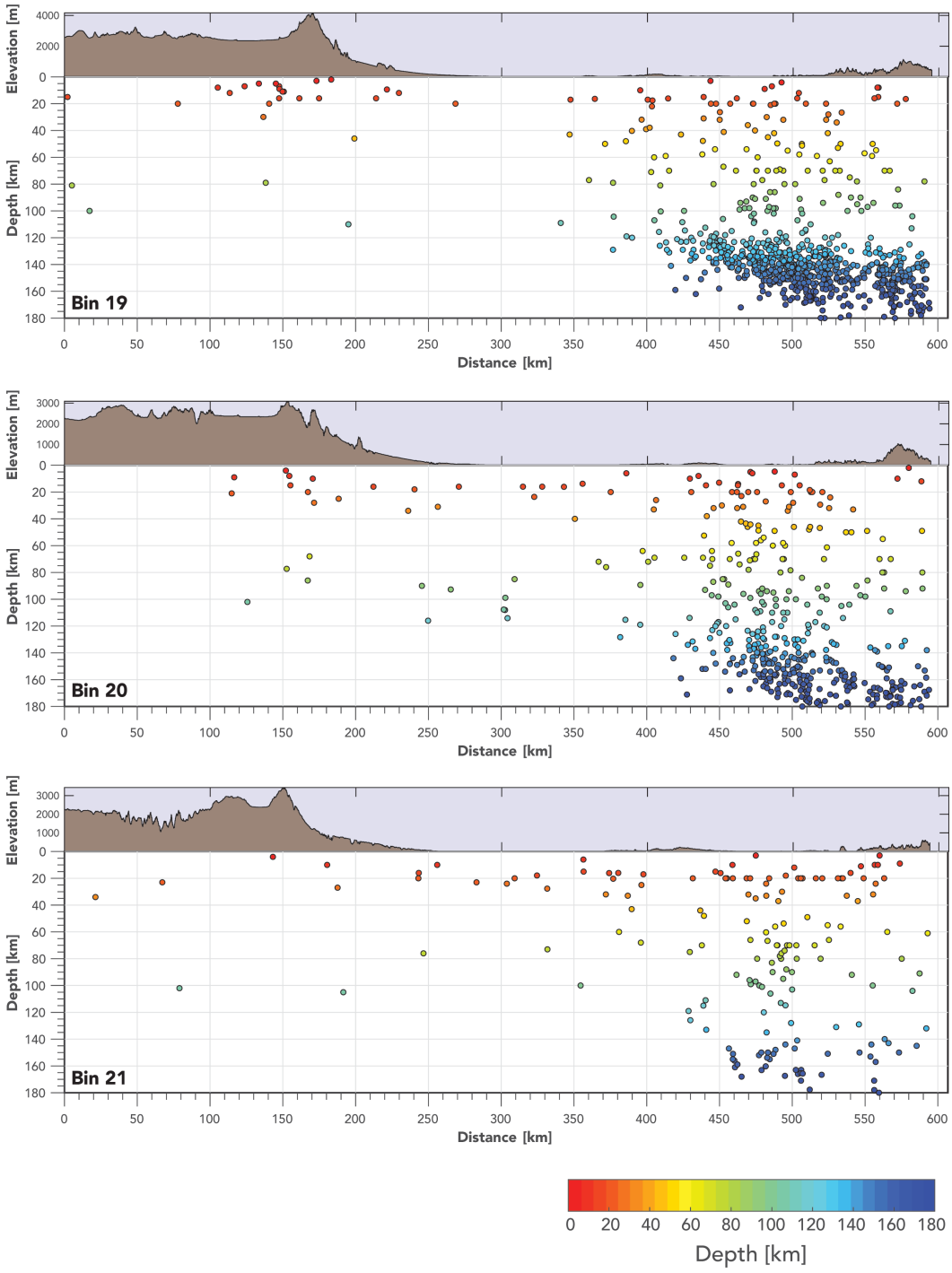

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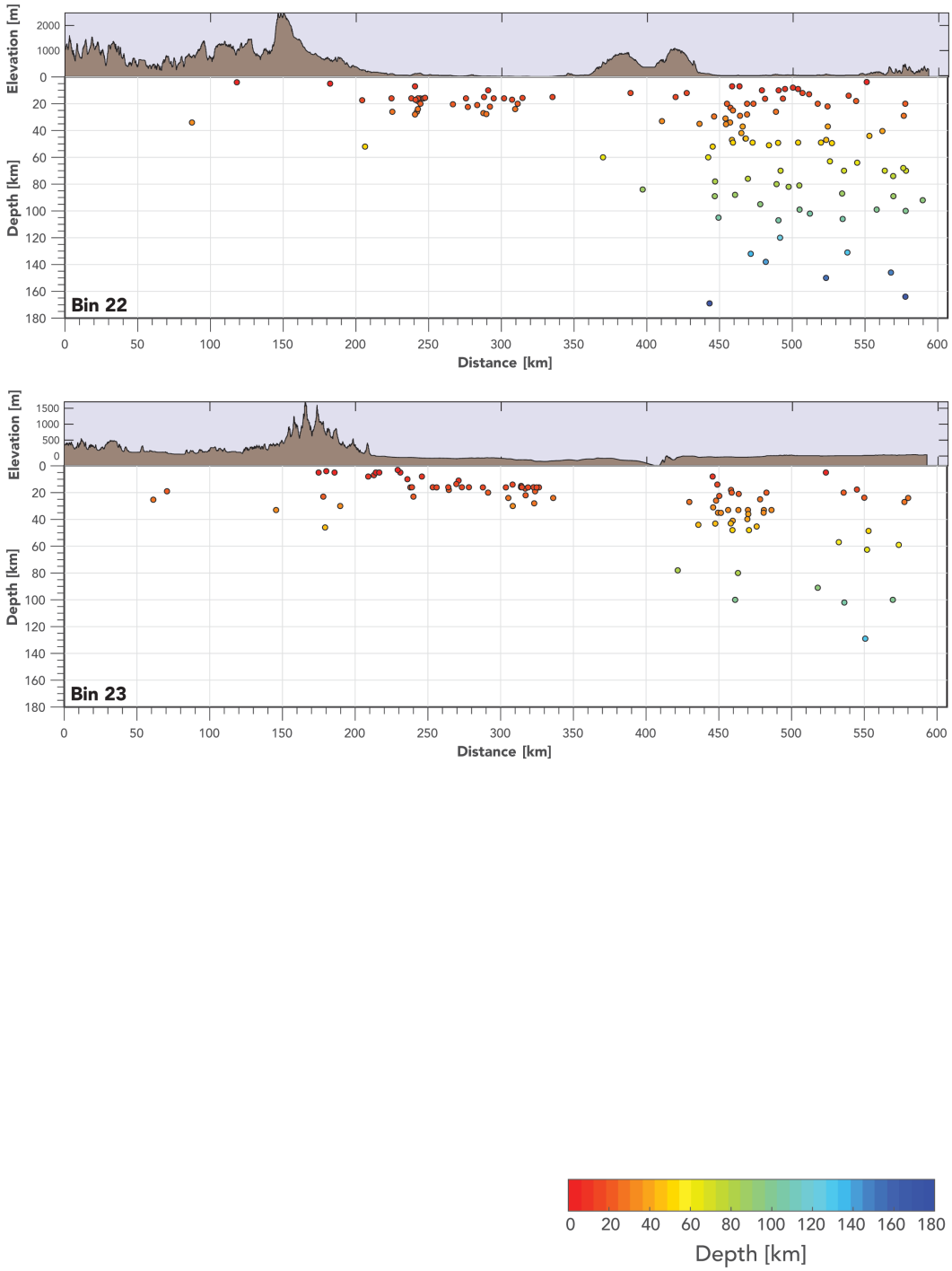

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